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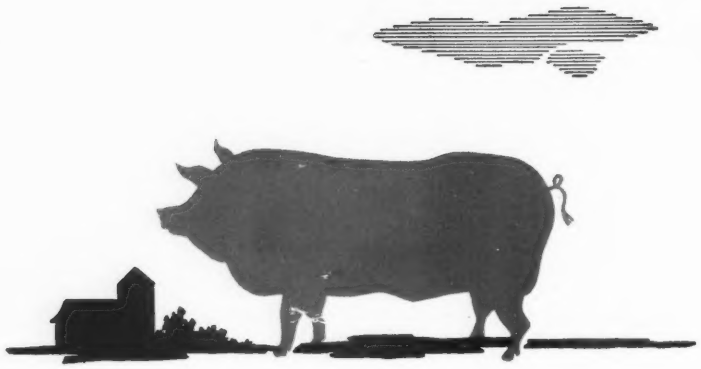
The American FERTILIZER



this little piggie stays home

Mange is the reason. It keeps pigs from going to market—costs swine growers huge sums of money each year. Mange stunts the growth of young hogs, delays fattening, and causes some deaths. Many hogs are discounted at the market. But, there's a remedy—quick, sure and cheap. It's benzene hexachloride wettable dust—applied as a water spray. One treatment often effects a complete cure.

Commercial Solvents is producing technical-grade benzene hexachloride of a dry, flake type. It is sold to manufacturers who grind and formulate insecticides.

CSC

AGRICULTURAL DIVISION, COMMERCIAL SOLVENTS CORPORATION, 17 EAST 42nd STREET, NEW YORK 17, N. Y.

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The American FERTILIZER

Vol. 109 AUGUST 7, 1948 No. 3

American Chemical Society Meeting

Fertilizer Division to Meet at the Hotel Annapolis, Washington, D. C., August 13 and September 1, 1948. Phosphate Symposium Main Feature. Hester and Sauchelli to Preside.

THE Fall Meeting of the American Chemical Society will be held in Washington, D. C., during the week of August 30th. The Division of Fertilizer Chemistry has been assigned the Hotel Annapolis as its headquarters and meetings will be held during the morning and afternoon of Tuesday, August 31st and Wednesday, September 1st, in the Everglades Room of that hotel. This room is air-conditioned and well equipped to present adequately the program which has been arranged under Jackson B. Hester, chairman, and Vincent Sauchelli, secretary of the division.

Tuesday Sessions

The Tuesday sessions will be devoted to a symposium on the mining and processing of phosphates and their use in agriculture. Fourteen papers will be presented, starting with an introduction by Mr. Sauchelli, followed by a report on the History and Progress of Phosphate Flotation, by James A. Barr, of the Armour Fertilizer Works. Abstracts of the other twelve papers are included later in this article.

Wednesday Sessions

The Wednesday sessions will cover other general phases of fertilizer chemistry. The program for the morning session is as follows:

I. E. Miles. Interpreting Great Volumes of Data from the Soil Testing Laboratory for Use of the National Business Machine.

Paul C. Marth, John O. Hardesty, and John W. Mitchell. Stability of 2–4–D in Mixed Fertilizers.

W. D. McClellan, Neil W. Stuart, and K. G. Clark. Flower and Corm Production of Gladiolus as Affected by Fertilizer Applications in the Greenhouse and in the Field.

Gennard Matrone, J. A. Weybrew, W. J. Peterson, and F. W. Sherwood. Studies on the Biological Measurement of the Nutritive Value of Forage Plants as Influenced by Fertilization.

H. P. Cooper. The Significance of the Relative Energy Properties of Ions to the Intensity of Oxidation-Reduction Reactions of Some Nutrients.

George H. Serviss. Some Practical Considerations in the Addition of Micronutrients to Fertilizers.

Benjamin Wolf. The Use of Commercial Fertilizer in Vegetable Crop Production at Seabrook Farms.

I. E. Miles. Progress in Soil Testing in the South During the Last Decade.

C. L. W. Swanson. The Use of Composts, Night Soil and Unusual Fertilizers in the Soil Fertility Program of Japan.

In the afternoon, the following papers will be presented:

K. D. Jacob and R. W. Cummings. Fertilizer Progress in Bizonal Germany.

A. L. Mehring. Relation Between Plant Nutrients Removed from Soils by Harvesting Crops and Replaced in Fertilizers and Manures.

This session will conclude with a business

meeting at which officers for the Section will be elected for the coming year.

Abstracts of Papers for the Phosphate Symposium

Processing Phosphate Rock

T. L. Wilkerson, American Cyanamid Co., Toccoa, Ga.

Phosphorus is always found in nature combined with other elements, and these compounds are known as phosphates. The world's supply of phosphate rock and apatite is estimated at about 26,000,000,000 tons, of this total about 13,000,000,000 tons are located in the United States.

It is the custom in the fertilizer industry to express the quality of phosphate rock in terms of tricalcium phosphate. Nevertheless tricalcium phosphate is seldom found in phosphate rock, as the phosphate has the complex apatite (calcium phosphate-fluoride) structure containing fluorine principally in the phosphate molecule. To render phosphates more available for plant food, Lawes in 1842 took out a patent for the acidulation of bones. This same treatment was later found applicable to phosphate rock.

Domestic production of superphosphate started in Baltimore about 1850. The production of this product has increased from 31,000 tons in 1868 to about 9,000,000 tons produced in the United States in 1947. The average content of available P_2O_5 in ordinary superphosphate has increased from 11 per cent in 1880 to about 20 per cent in 1947. The physical condition of superphosphate has been greatly improved and the time required for curing and drying has been reduced.

Ordinary superphosphate containing not more than 22 per cent available P_2O_5 is considered a low-analysis phosphate, but because of the simplicity of the manufacturing process combined with the low cost of producing a unit of available P_2O_5, ordinary superphosphate will continue to supply a considerable portion of this country's agricultural phosphorus.

Modern Trends in Superphosphate Manufacture

Wm. T. Doyle, Sturtevant Mill, Dorchester, Boston 22, Mass.

In the early days of the manufacture of superphosphate in Europe from either bone or mineral phosphate, the mixture with sulphuric acid was made in a very crude manner. Subsequently improvements had to be made, such as closed chambers and mechanical mixers, because of the use of different types of mineral phosphate, and the difficulty encountered in the gases emanating from such mixtures. Early American installations conformed to those of Europe with abundant use of labor. Europe on the other hand considered much earlier the use of mechanical equipment to eliminate hand labor than we did in this country and even today hand labor is used in plants here, whereas it is practically unknown in Europe.

Mechanical dens were developed in Europe and had wide application there some time before their introduction in the United States. The earliest mechanical dens in the United States were introduced around 1910. From that time until 1921, when the Sturtevant Beskow Den was introduced, there were very few mechanical den systems. Since 1921 there has been a gradual increase in the use of mechanical batch den systems until at the present time 75 per cent of the industry is so equipped. Continuous den systems developed in Europe and only in the past 20 years have they been seriously considered in this country. At the present time there are some 15 continuous den systems in use in the United States.

The foreseeable trend for the future in superphosphate manufacture appears to be along the lines of continuous operation covering the finished product as granulated superphosphate as well as complete mixtures.

Phosphate Processes at Trail, British Columbia

James Atwell, Consolidated Mining and Smelting Co. of Canada, Ltd.

Mine run phosphate rock is crushed to 3/8 inch, dried, and continuously wet-ground in phosphoric acid in pebble mills. Pebble mill discharge together with some dry fine ground phosphate rock is reacted in five agitators in series. Sulphuric acid is fed to agitators four and five. Slurry is recirculated from agitators four and five to the head of the circuit. Temperature of the slurry is controlled by blowing in air.

Conditions of temperature, free sulphuric acid four, and P_2O_5 concentration are carefully controlled in the agitators to produce readily filterable $CaSO_4\ 2H_2O$. $CaSO_4\ 2H_2O$ is filtered off. Repulping, agitation, and filtration follow in two successive stages with countercurrent washing of the gypsum on the filter.

Production acid averages 32 to 33 per cent P_2O_5 and washed gypsum contains about 1 per cent P_2O_5.

Two grades of ammonium phosphate are made, 11–48–0 and 16–20–0. Phosphoric acid evaporated to 37 to 38 per cent P_2O_5 in Swenson low pressure steam evaporators is

(Continued on page 19)

Some Implications of Soil Fertility*

By Howard W. Selby

President, Walker-Gordon Laboratories of New England, Inc.

Presented in behalf of the Certified Milk Producers' Association of America, Inc.

IT IS a distinct privilege to be invited to appear on the program of your National Fertilizer Association Convention representing a group with whom you have much interest in common. The Certified Milk Producers' Association of America has spearheaded progress in a field which is the symbol of health and happiness to countless thousands through the use of a product which has established standards for itself far in excess of normal demands. That product, certified milk, is dependent for its proper production on healthy cows which, in turn, are the symbol of fertile lands.

Much has been said and written about the soil. Your association and other organizations concerned with the conservation of our resources as well as their fruitfulness, are devoting much time and effort to the detailed study of these matters. They are far-reaching and complex. They tax the best analytical minds and should continue to be of paramount importance. I would like to share with you a few thoughts, from a layman's point of view, on what I consider to be some of the major implications of soil fertility. There are three main groups: health and nutrition, economics, and conservation.

The American public has become suddenly aware of the benefits of soil in many different ways and in as many parts of the nation. Particular features such as the improved condition of teeth in certain areas of Texas provide the people of that region with a particular sensitivity to the benefits in their section.

There is also a negative manner in which people become conscious of the soil and its values. The Vanport flood in the Columbia River Basin was a vivid demonstration of the result of poor conservation practices. This is costly experience, in terms of relief, and of acres of destroyed soil which were depended upon for the production of food.

When forests are cut down, the natural water-holding capacity of a region is decreased, releasing such quantities of water to be otherwise controlled by man, often too late to conserve the value of the best soil in the valley. These problems cut across the best interests of our entire society and bear a relationship to business, industry and faith.

The word *soil* has various meanings. Fundamentally, we know it as the good earth of mineral and organic matter in which plants may thrive and over which man may exercise dominion.

On a broader view, the soil is any medium in which things may take root and grow. These things do not have to be plants and animals; they may include social discontent—the soil most fruitful for the growth of anarchy.

When we talk about soil we are talking about agriculture; and when we talk about the science and art of cultivating the fields and soils we are talking about the "basis of our national life and prosperity."

Clearly, this matter of soil is related to the fundamental and natural basis of life. Life is complex, involving not only the physical needs of humanity, but also the social and spiritual conscience of civilization itself. A sound philosophy of life must give proper values to the natural world which will be in line with consistent personal, social and spiritual ends.

Those who are closely associated with fertilizer organizations have a vocation allied with two extremes of life: On one hand, they are concerned with the minutiae of chemical reaction and productivity. On the other hand they are dealing with processes included in the dominion of the Almighty. It is a vocation of the highest order.

Health and Nutrition

The matter of health today is a far-reaching process. Witness the many great national organizations that are conducting programs to make people health conscious. These, together with hospitals and institutions, make available an organization to reach the multitudes. Through these institutions we make the contacts necessary to tackle those problems which plague our civilization.

*As presented at the annual June convention, The National Fertilizer Association, White Sulphur Springs, W. Va., June 21–23, 1948.

Dr. Jonathan Forman reminds us that too much medical practice is devoted to patching up the broken bodies, which he acknowledges is worthy but, he says, "it has nothing to do with robust health." One of the fundamental social and health programs of our time is concerned with this matter of soil fertility. Dr. Forman raises the matter of nutrition. Much harvesting, processing and over-refinement of food brings about the loss of vitamins and other essentials. He cites further the trend of our civilization toward fewer and larger farms, brought about by industrialization and centralization which have increased competitive techniques. This, in turn, has stepped up the tempo of the development of large-scale business operations. The farmers of America are faced with the implications of this competitive struggle and have been forced to mine their land rather than manage it. Often, faulty agricultural practices have washed away some of the minerals which would have entered the cells of the plant but which never get the chance. Soil fertility affects us all.

Needed Elements

Consider the part calcium plays: In Deaf Smith County, Texas, near the New Mexico border, there is little decay of teeth. The soil is rich in calcium, phosphorus and magnesium, with a mere trace of fluorine . . . "Calcium maintains the normal clotting of blood, normal rhythm of the heart, normal irritability of the nerves and muscles. It regulates the permeability of the cells so that food materials once in solution in our tissues can flow into and nourish all of the cells. Where there is a mineral deficiency, all of these important functions are affected unfavorably; the victim becomes irritable, nervous and is often a real medical problem.

"Too many people," Dr. Forman says, "do not take enough calcium. We no longer drink milk. We do not eat enough salads. As a result, our bones become thin and brittle. Our backs become badly bent. Lime is the first mineral to be washed out of the soil when bad farming practices are used."

From a dietary standpoint, proper relationships of both iron and copper are needed. And this requirement must be adjusted in sections of the country that are short on these elements in the soil.

Boron affects calcium metabolism and serves as a kind of catalytic fertilizer. Boron deficiency in fruits, truck and field crops requires that the proper amount be supplied in fertilization.

In fairness to the complexity of the problem this word by C. A. Browne, Supervisor of Chemical Research of the Bureau of Chemistry and Soils, should be added:

"While it is possible to increase to a certain extent the content of valuable mineral constituents of some crops by special intensive methods of fertilization, a warning should be sounded against any exaggerated and sensational claims for mineralizing human and animal foods." On the basis of a large body of discussion based on extensive experimentation, Browne pointed out, "It is evident that the mineral content of crops can be modified within certain limits in numerous ways. Different varieties of wheat, potatoes, peas, beans and cabbage, for instance vary in their capacity for assimilating potassium, calcium, magnesium, phosphorus and other mineral elements from the soil. Certain strains of plants might therefore be cultivated to produce more of a given mineral nutrient which would perhaps be advantageous for specific purposes provided there was not a corresponding loss of some other valuable constituent.

"There are, however, so many factors, such as differences in soil cultivation, altitude, rainfall, temperature, sunshine, etc., whch influence the yield and composition of crops that a *mineralization formula* producing favorable effects in one region might prove to be detrimental in another locality."

It is fairly obvious that our health depends primarily upon sanitation and nutrition; that the quality of our nutrition depends upon the soil in which it is grown. The consideration of health, individually or nationally, should be considered from the ground up.

According to Dr. Harold B. Davidson, former president of the Medical Society of the County of New York, "there is so much ill health blamed on other causes, actually due to poor nutrition . . . and the poor nutrition is due to the poor nutrition of the soil, the vegetables, the milk and the meat that we consume. We also feel that erosion and bad use of forests and farmlands has become a serious major problem, not only of our government but really in a sense of all people in the world. Just what steps we will be able to take to help correct this situation remain to be seen, but we (the Medical Society) are at least actively interested in the problem, investigating it and hope to be of some service to our fellowmen."

Firman E. Bear is right when he says, "The soil puts its mark on man." Intensity of agricultural production is needed to feed our millions at home as well as those abroad. More than 140,000,000 acres of land are torn up every spring and kept clean all summer.

(Continued on page 26)

Some President Economic Considerations*

By Hon. A. L. M. WIGGINS
Under-Secretary of the Treasury, Washington, D.C.

(Continued from the issue of July 24, 1948)

Corporate Profits

A comparison of corporate profits with those after World War I is somewhat difficult because of the great growth in our industrial plant and in the corporate form of business enterprise. The Treasury Department has estimated, in its testimony before Congressional committees, that in the calendar year 1947 corporate profits after taxes amounted to about 19 billion dollars. This is an increase over 1939 of a little more than 200 per cent. In 1919—the best profit year in the period immediately following World War I—corporate profits aftert axes amounted to about six billion dollars, an increase as compared with 1914 of only about 60 per cent.

The economy has so grown during the intervening period that a comparison of dollar profits is almost meaningless. But there is one pair of figures that sticks in my mind. In 1919, corporate profits after taxes amounted to 8.1 cents for every dollar of the gross national product; in 1947, the corresponding proportion was 8.2 cents for every dollar of product.

The amazing similarity in the proportion of the national product represented by corporate profits in those two good years—28 years apart—is a fact of striking significance. It is equally sobering to those who say that today's corporate profits are excessive, and to those who say that the "good old days" have gone forever.

I should like to emphasize that the comparison which I have just made between corporate profits and the gross national product applies to two *good* years. Corporate profits are one of the most flexible elements in our economy. They must be expected to be high in good years and low in poor ones, but in absolute amount and as a proportion of the total product. In 1921, for example, net corporate profits disappeared completely.

* Presented at the 23rd Annual Convention, The National Fertilizer Association, White Sulphur Springs, W. Va., June 21-23, 1948.

An Improved Outlook

When we summarize all of the relevant factors in our present economic situation as compared with 1920, we discover that there are basic elements of financial and economic strength in our economy today that can support prices and business more firmly and for a longer period than in 1920. In addtion, there are fewer weaknesses in our price structure and in the credit structure now than there were in the former period. How many of us can well remember the widespread speculation in cotton and sugar and wheat, and in practically all goods, which eventually led to the 1920 collapse.

This does not necessarily mean that both prices and production may not decline. It does indicate, however, that if further price advances are avoided, and if our credit structure does not become weakened, there is little likelihood, in my opinion, of anything approaching the severe declines of 1920 and 1921.

I do not mean to say that we cannot expect price adjustments in the years ahead and the likelihood of price reductions in many lines. As production and demand come into better balance, price adjustments are inevitable. At the moment, our task is to hold the line on the inflation front and to prevent further price rises that might eventually result in severe readjustments.

Management of Debt

In the furtherance of this aim, the management of the public debt occupies a position of high importance. An outstanding problem in debt management arises from the huge size of the debt—approximately 250 billion dollars. The importance of the debt, however, is not merely in its size, but in its proportion to the total of all debt, the impact of its management on general interest rates, the cost of servicing it, and proper provision for its retirement.

In the 1920's, the public debt—both Federal, and State and local—was less than 20

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Principal Articles in This Issue

Agricultural Conservation Program for 1949 Announced

The 1949 Agricultural Conservation Program, announced on August 3rd by the U. S. Department of Agriculture, will provide six major groups of practices through which farmers can help to protect the nation's soil and water resources. These groups of practices will aim at (1) protecting soil from wind and water erosion; (2) restoring and maintaining soil productivity; (3) restoring and maintaining sustained yields on range and permanent pasture; (4) conserving and obtaining efficient use of water for agriculture; (5) making needed land use adjustments possible; (6) establishing, restoring and maintaining farm woodland at high levels of sustained yields.

The program is the result of the annual reexamination by the State Committees and the Agricultural Conservation Programs Branch of the Production and Marketing Administration of practices designed to keep the soil and water conservation program in line with changing conditions. It is geared to prospective food needs, and the necessity of increasing soil and water conservation, and to developments in conservation methods.

The program will emphasize meeting the most urgent conservation problem first. This "most urgent" problem will vary with different States, counties, and areas of the country but whatever the problem—erosion, water conservation, need for better cropping systems, or watershed protection—efforts will be sharply focused on meeting the particular problem. Under the program each county committee will use funds allocated to assist farmers in carrying out conservation practices where they will get the most conservation for each dollar spent.

The national outline of the 1949 program has already been sent to state PMA committees. These committees have the responsibility of developing state programs within the provisions of the national outline and adapted to the conservation needs of areas within States. County agricultural conservation committees in turn will use the state program as the basis for county programs adapted to the needs of the county and the needs of the individual farms within the county.

Assistance to farmers under the Agricultural Conservation Program is helping to put into practical use the results of study and research in soil and water conservation methods. In developing a state program, a state technical committee checks and reviews practices

and practice specifications. This committee is made up of the chairman or a member of the state PMA committee, representatives of the Extension Service, Experiment Station, Soil Conservation Service, State Department of Agriculture, and other groups or agencies interested in agriculture. Membership varies with states but in the main the committee is made up of technicians and soil and crop specialists.

Congress has authorized the initiation of a $262,500,000 Agricultural Conservation Program for 1949. Assistance in the form of materials, services and financial aid is limited under the 1949 program to not to exceed $750.00 per person.

The Agricultural Conservation Program is in operation in every agricultural county in the United States and in Hawaii, Alaska, Virgin Islands, and Puerto Rico. A total of 3,029 county committees administer the program at the county level. Around 30,000 farmer-elected community committees with 90,000 members administer the program at the community level.

Cottonseed Production Increased

During the year ending July 31, 1948, the amount of cottonseed received at the mills was 4,074,820 tons, according to the U. S. Bureau of Census. This is a million tons more than were received during the previous year. Production of cottonseed cake and meal during 1947–48 totaled 1,897,865 tons, compared with 1,362,652 tons in 1946–47. Other production figures for the current year include over a billion pounds of refined oil, 921,879 tons of hulls, 1,281,481 bales of linters.

Jackson Appointed St. Regis Advertising Manager

Kenneth D. Lozier, vice-president, St. Regis Sales Corporation, subsidiary of St. Regis Paper Company, announces the appointment of Norton B. Jackson as advertising manager of the company.

Mr. Jackson came to St. Regis from the American Can Company where he had acted as advertising manager and previous to that had been for a number of years advertising manager of the Thatcher Glass Manufacturing Co., Inc., at Elmira, N. Y.

Mr. Jackson is a member of the Job Finding Committee of the Advertising Club of New York and of the Public Relations Committee of the Boy Scouts of America. He resides at Scarsdale, N. Y.

Fertilizer Application Committee to Meet in Cincinnati

The National Joint Committee on Fertilizer Application will hold a meeting at the Hotel Gibson, Cincinnati, Ohio, on Wednesday, September 8th. Sessions will be held at 9:30 A. M. and at 1:00 P. M., at each of which four talks will be given on various phases of practical fertilizer application. Both sessions are open to all who are interested in this important subject.

The morning session will include the following addresses:

Work of the National Joint Committee on Fertilizer Application in Relation to Horticultural Science. Dr. A. L. Schrader, Maryland Experiment Station.

An evaluation of fertilizer practices on tree and small fruit crops. Dr. W. P. Judkins, Ohio Experiment Station.

An evaluation of fertilizer practices on vegetable crops. Dr. J. B. Hester, Campbell Soup Company.

The role of radioactive isotopes and other new techniques in evaluating fertilizer practices. Dr. F. W. Parker, U. S. Department of Agriculture.

The afternoon program is as follows:

An application of nutrients to the aboveground parts of plants to correct deficiencies. Dr. D. I. Arnon, California Experiment Station.

The soilless culture method of supplying the nutrient requirements of plants. Dr. O. W. Davidson, New Jersey Experiment Station.

Fertilizer application equipment. R. M. Merrill, Farm Equipment Institute.

The closing item will be a panel discussion on "The role of legume and non-legume cover crops, and sod and hay crops, and their fertilization in rotations to improve soil structure and fertility." Taking part in the discussion will be Kirk Fox, editor, *Successful Farming*; B. A. Krantz, N. C. Experiment Station; D. R. Dodd, Ohio Experiment Station; E. H. Tyner, W. Va. Experiment Station; G. N. Hoffer, American Potash Institute; J. D. Warner, N. Florida Experiment Station; G. R. Muhr, Minnesota Valley Canning Company; H. H. Tucker, Coke Oven Ammonia Research Bureau; M. H. McVickar, The American Fertilizer Association.

The officers of the National Joint Committee for this year are: *Chairman*, Arthur W. Turner, Assistant Chief, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. D. A., Beltsville, Md. *Vice-Chairman*, Dr. C. H. Mahoney, Director, National

Canners Association, Washington, D. C. *Secretary-Treasurer*, Fred S. Lodge, Acting President, National Fertilizer Association, Washington, D. C.

The following, in addition to the officers, compose the Executive Committee: Dr. H. B. Siems, Plant Food Division, Swift & Co., Chicago, Ill.; Dr. Jackson H. Hester, Agricultural Research Department, Campbell Soup Company, Riverton, N. J.; R. M. Merrill, Agricultural Engineer, Deere & Co., Moline, Ill.; J. D. Barnard, Minnesota Valley Canning Co., Le Sueur, Minn.; G. A. Cumings, Agricultural Engineer, Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Md.; H. H. Tucker, Coke Oven Ammonia Research Bureau, Columbus, Ohio.

N. F. A. Fall Meeting

The 1948 fall meeting of the National Fertilizer Association will be held at the Atlanta Biltmore Hotel, Atlanta, Ga., on November 15th, 16th and 17th. An interesting program is being arranged. Those planning to attend should make reservations directly with the hotel.

Fulton Bag & Cotton Mills Buys Los Angeles Plant

The Fulton Bag & Cotton Mills, with headquarters in Atlanta, Ga., has announced the purchase of the bag business of West Coast Bags, Inc., of Los Angeles, Cal. At the present time Fulton operates factories in Atlanta, New Orleans, St. Louis, Dallas, Kansas City, Minneapolis, and Denver.

The tremendous growth in population, agriculture, and industry on the West Coast made it important that Fulton provide better service facilities for its growing group of customers in the Coast area.

Jack C. Baldwin, who has been president and manager of West Coast Bags, Inc., will continue as manager of this Los Angeles plant and the organization will be maintained largely with its present personnel. Otis G. West, who has been with the Fulton Company 30 years, is being transferred to the Los Angeles plant as an assistant to Mr. Baldwin.

The Los Angeles plant will continue to serve the industries on the Coast, and a continuity of operation will be maintained. Present contracts of customers of West Coast Bags, Inc., will be executed by Fulton.

June Sulphate of Ammonia Production

Production of by-product sulphate of ammonia during June totaled 69,269 tons, a drop of 2.3 per cent from May, according to the figures of the U. S. Bureau of Mines. An additional 2,405 tons was produced from purchased synthetic ammonia. Production for the first half of 1948 was about 12,000 tons greater than for the same period of 1947. Shipments amounted to about the same tonnage as production, with stocks on hand at producing plants increasing slightly to 25,916 tons at the end of the month. There was little change in the output and shipments of ammonia liquor.

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH_3
Production		
June, 1948	69,269	2,073
May, 1948	70,887	2,143
June, 1947	65,275	2,071
Jan.-June, 1948	402,672	12,109
Jan.-June, 1947	390,492	12,880
Shipments		
June, 1948	65,873	1,510
May, 1948	66,703	1,580
June, 1947	61,408	2,058
Stocks on Hand		
June 30, 1948	25,916	586
May 31, 1948	23,239	643
June 30, 1947	22,417	709

FERTILIZER MATERIALS MARKET

NEW YORK

Sulphate of Ammonia Contracts Contain "Elevator" Clause. Chemical Nitrogen Still Short of Demand. Some Vegetable Organics Lower for Future Delivery. Superphosphate Situation Balanced. Shortage of Potash Expected for Next Season.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, August 4, 1948.

Sulphate of Ammonia

Shipments were being made on new contracts but no spot material was obtainable. Under most of the present contracts, producers have the option to increase the price at 30 days notice to the buyers. There were some export inquiries in the market.

Nitrate of Soda

Very little activity was reported in this material but buyers are always eager to accept material when offered to them.

Nitrogen Solutions

One other producer increased his price about $10.00 per ton on this material, following the advance recently made by several other producers. This material was reported to be in a tight position for nearby shipment.

Ammonium Nitrate

No recent price changes have been heard of and shipments are being made against contracts. Demand continued good from various buyers.

Organics

The market in fertilizer organics remained about the same, but some packing house by-products were showing a firmer tone. Blood sold at $7.00 per unit of ammonia ($8.51 per unit N) and tankage sold at the same price. Meat packers report their production has fallen considerably, due to consumer resistance to the high price of meat. Most producers of these materials were well sold up. On the other hand, vegetable meals presented an easier tone and future positions could be bought at considerably under present spot prices. While soybean meal was selling around $80.00 per ton, f.o.b. Decatur, for prompt shipment, late fall shipment could be purchased as low as $63.00 per ton, with cottonseed meal in the same position. So far very little has been heard of the Government position regarding the export of these vegetable meals.

Fish Meal

This material was a little stronger and most fish factories were reluctant to sell ahead until they were able to ascertain just how much fish they would catch the remainder of the fishing season.

Castor Pomace

No material was available for nearby shipment with producers sold ahead on contract and the demand was good from various directions.

Bone Meal

The production has been cut down by some producers and available supplies are going mainly to the feed trade where the business has been reported good. Some fertilizer buying was noted.

Hoof Meal

Very few offerings were being made and the demand continued fairly good from both fertilizer and industrial buyers. South American material was reported out of line in price with domestic material. Last sales were made at $6.50 per unit of ammonia ($7.90 per unit N), f.o.b. shipping points.

Superphosphate

While there was no urgent demand for this material for quick shipment, deliveries were being made against existing contracts and the situation was being pretty well balanced. Triple superphosphate was in demand for export, with practically no material available.

Potash

This material was still sought by most fertilizer manufacturers, who feel they may be short before the new season ends. No word was received of any further sales of imported material.

PHILADELPHIA

Shortage of Chemical Nitrogen Continues. Organics Market Firmer. Phosphate Rock Demand Still Ahead of Production

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, August 2, 1948.

Very strong demand continues for chemical nitrogen for prompt and future. The supply is decidedly short of requirements, and what small tonnage of resale there may be, commands a premium. Organics are stronger.

Sulphate of Ammonia.—Supply is exceedingly limited and far below demand. It is feared contract deliveries may fall below last season's tonnage. Inquiries at this time are unusually numerous.

Nitrate of Soda.—Demand is exceedingly brisk with stocks quite scarce. First imports of the new season are expected shortly.

Ammonium Nitrate.—There is strong demand but offerings seem limited to less than carlots, principally for chemical use.

Castor Pomace.—Present production is under contract and no recent offerings noted.

Blood, Tankage, Bone.—Market is stronger, with increased interest shown by the feeding trade. Many fertilizer mixers missed the chance to pick up tankage and blood at quite reasonable figures during the recent lull. Blood and tankage are presently quoted at $7.00 per unit of ammonia ($8.51 per unit N) in the east, and $7.50 ($9.12 per unit N) in the Chicago area. Bone meal can be had but the supply is not by any means large.

Fish Scrap.—Market has gained strength, with scrap quoted at $110.00 to $115.00, and meal at $120.00 for 60 per cent protein, or $125.00 for 65 per cent grade.

Phosphate Rock.—Accumulation of aboveground stocks is practically impossible with the demand keeping ahead of production. The increase in mining capacity has not yet eased the situation.

Superphosphate.—Market is firm at 76½ cents to 78 cents per unit A.P.A. for normal grade, while triple is rather scarce and quoted nominally at 83 cents in Florida.

Potash.—The demand continues ahead of current production, and the effect of the recent strike in New Mexico is keenly felt.

CHARLESTON

Breakdown at Hopewell Nitrogen Plant Adds to General Shortage. Production of Superphosphate and Potash Normal with Strong Demand.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, August 2, 1948.

Considerable concern is being evidenced by fertilizer manufacturers as a result of a reported serious break-down of the Hopewell Nitrogen Plant operated by the Barrett Company. It is expected that lost production cannot be made up. Potash is back to normal production and superphosphate is in seasonal demand, with supply apparently adequate.

Organics.—Interest in feed grade organics, such as blood and tankage, has increased in the last week or two but interest on the part of fertilizer manufacturers is light. Some blood recently sold at around $7.25 ($8.82 per unit N), Chicago basis, to fertilizer manufacturers, but most buyers consider the price too high. Domestic nitrogenous is obtainable at $3.25 to $4.00 per unit of ammonia ($3.95 to $4.86 per unit N), depending on the shipping period and the production point. There is little interest in European or South American organics, due to the high prevailing prices.

Castor Pomace.—The market is nominal at $27.50 per ton in bags, f.o.b. eastern shipping

point, with no sales reported recently. Offers are temporarily withdrawn from the market.

Dried Ground Blood.—There are very few offerings in the market, but prices are around $7.25 to $7.50 ($8.82 to $9.12 per unit N) f.o.b. Chicago and $7.00 to $7.25 ($8.51 to $8.82 per unit N) at New York.

Nitrate of Soda.—Demand is active, which maintains the market in a firm and tight position. Importations for January 1st through April, 1948, nearly doubled importations for the same period of 1947.

Potash.—Demand continues active and in excess of present production. Movement is mainly against contract commitments. Approximately 13,000 tons of imported muriate arrived during April according to trade reports. Production of potash in the Anglo-United States zone in Germany amounted to approximately 115,000 tons of K_2O January through March, which amounts to approximately 10,000 tons more than was produced October through December, 1947.

Phosphate Rock.—Demand continues active from export and domestic buyers. Steady shipments prevent any noticeable stock accumulations at the mines.

Superphosphate.—Run - of - pile superphosphate can be obtained at 68 cents per unit of A.P.A. at Jacksonville, and 71 cents per unit at Charleston and Savannah. The market at Baltimore is nominally at 76 cents. Considerable movement is being made against contracts and demand continues even.

Sulphate of Ammonia.—Demand continues well in excess of supply with sales reported at $40.00 to $45.00 per ton, in bulk, f.o.b. the producers' ovens.

Ammonium Nitrate.—Production during May for fertilizer purposes is reported at 61,425 tons. Demand continues heavier than supply. No recent change in price has been reported.

CHICAGO

Ammoniates Trading Still Slow. Possible Reduction of Prices in Near Future.

Exclusive Correspondence to "The American Fertilizer"

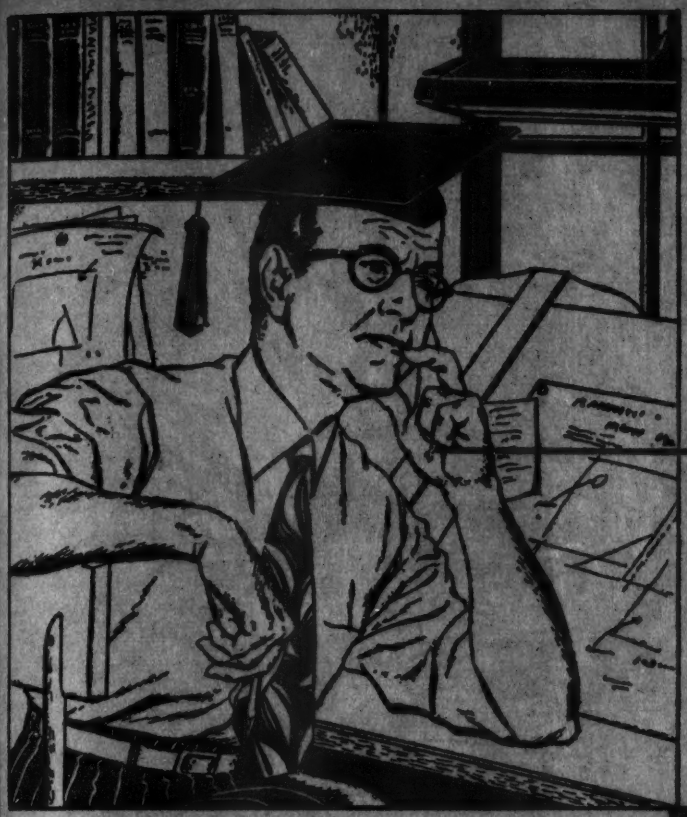
CHICAGO, August 2, 1948.

Actual trading in animal ammoniates in Chicago area has been very slow during the past two weeks. While prices remain unchanged, new business has not appeared to be keeping up with production and in some spots material is beginning to accumulate in the hands of producers. Unless trading is stimulated in the near future it may be necessary to reduce prices in order to attract buyers for purchasing in greater volume.

Digester tankage, 60 per cent protein, ranges from $100.00 to $110.00 per ton, and 50 per cent meat scraps, $95.00 to $105.00 per ton, both according to location. Unground dry rendered tankage is steady at $1.70 per unit of protein, and wet rendered tankage, $7.50 to $8.50 per unit of ammonia ($9.12 to $10.33 per unit N), depending upon quality. Dried blood is nominally quoted at $7.25 to $7.50 per unit of ammonia ($8.82 to $9.12 per unit N). Steamed bone meal is unchanged at $60.00 to $65.00 per ton, and raw bone meal, $55.00 to $60.00 per ton.

Potash Deliveries for First Quarter, 1948

A total of 553,408 tons of potash salts containing an equivalent of 292,488 tons of K_2O was delivered during the first quarter of 1948 by the five major American producers, according to the American Potash Institute. This represents an increase of 7 per cent in salts and 6 per cent in K_2O over the corresponding period in 1947. Deliveries for agricultural purposes in the United States, Canada, Cuba, Puerto Rico, and Hawaii consisted of 507,566



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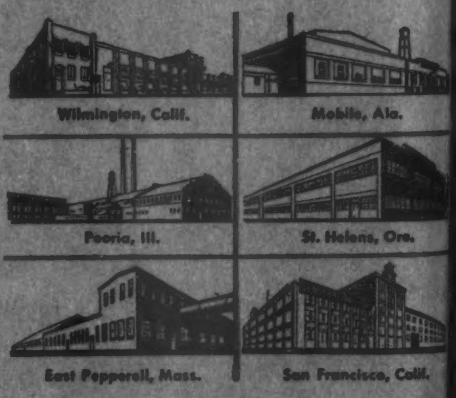

BEMIS BRO. BAG CO.

tons of potash salts equivalent to 264,020 tons of K_2O compared to 252,736 tons K_2O in the first three months of 1947. Muriate of potash predominated with 223,892 tons K_2O, whereas 20,598 tons were delivered as sulphate of potash and sulphate of potash magnesia, and 19,530 tons as manure salts. Deliveries for chemical purposes totaled 39,158 tons of salts equivalent to 24,312 tons K_2O, an increase of 29 per cent over the corresponding period a year earlier. Exports to other than Institute countries amounted to 6,883 tons of potash salts containing 4,156 tons K_2O, a decrease of 18 per cent under 1947.

POTASH DELIVERIES
Short Tons K_2O
(United States, Canada, Cuba, Puerto Rico, Hawaii)

	Jan.-March, 1948	Jan.-March, 1947
Muriate	223,892	222,267
Manure Salts	20,598	12,850
Sulphate & Sul. Pot. Mag.	19,530	17,619
Total Agricultural	264,020	252,736
Chemical Potash	24,312	18,886
Export (Other Countries)	4,156	5,063
Grand Total	292,488	276,685

AMERICAN CHEMICAL SOCIETY

(Continued from page 8)

continuously neutralized with ammonia gas in three agitators in series to pH 3.0 to 4.0. The hot monoammonium phosphate slurry is mechanically mixed with excess of fines screened from finished product. The circulating fines are thus built up in size, dried in a rotary dryer, and screened over double-deck vibrating screens. Oversize is pulverized and returned to fines circuit. Intermediate size is finished product 95 per cent—35 M, and 3 per cent 100 M.

16–20–0 is produced in the same way with addition of sulphuric acid with P_2O_5. No pre-evaporation of phosphoric is, however, required. Both products are very granular and free flowing.

Rock-Acid Ratio in Superphosphate Manufacture

M. Shoeld, E. H. Wight, and Vincent Sauchelli, The Davison Chemical Corp., Baltimore, Md.

An optimum ratio of raw materials exists at which the total raw material cost per unit of available P_2O_5 in cured superphosphate will be at a minimum for any given rock and acid cost. The value of the phosphate rock depends not only upon its P_2O_5 content, but also upon the extra acid consumed by impurities which participate in the reaction.

We have found it possible to predict this optimum rock-acid ratio by means of a nomograph based on the P_2O_5 and carbon dioxide content of the rock. This method has been successfully used in actual plant operations for a number of years. The investigation was primarily concerned with Florida rock but the method, with modifications, is applicable to phosphate rock from other sources.

From the nomograph one can quickly determine the percentage of acidulation after curing based upon any predetermined rock-acid ratio, the only provision being that the P_2O_5 and carbon dioxide content of the rock should be known with accuracy.

During the past few years we have found it most economical to operate on a basis of 97 to 98 per cent acidulation in the cured superphosphate. However, the basis will vary depending upon the relative price of the rock, the acid, and the composition of the rock. At all times it is necessary to stay within limits that lead to a satisfactory physical condition of the finished product.

Production of Defluorinated Phosphate Rock in Rotary Kilns

W. T. Whitney and C. A. Hollingsworth, Coronet Phosphate Co., Plant City, Fla.

A review of the development of a commercial process for defluorinating phosphate rock is given.

Phosphate rock and sand are ground, mixed in a definite ratio, and fed as a slurry to a rotary kiln. The material is treated at temperatures of 2700° to 2900° F. Water vapor is introduced at the hot end of the kiln and quick cooling of the product is effected. The discharged clinker, which is sintered but not fused, is ground and bagged for shipment. The product contains about 20 per cent P_2O_5 and 0.1 per cent or less fluorine. The phosphate constituent is alphatricalcium phosphate.

Current Trends in the Use of Rock Phosphate for Direct Application

T. R. Cox and M. V. Bailey, American Cyanamid Co., New York 20, N. Y.

Between 1940 and 1946, the use of finely ground phosphate rock for direct application fertilizer purposes increased nearly 400 per cent, while the sale of rock for acidulation increased about 80 per cent during this period. For the fertilizer year ended June 30, 1947, direct application phosphate rock had a further increase of 72 per cent over 1946, and it now constitutes about 10 per cent of the phosphate rock going into fertilizer usage. The following factors probably explain this strong trend:

1. Wider recognition of the value and proper place for direct application rock as a supplement to superphosphate in soil conserving and soil building programs.
2. Shortage of superphosphate in the Midwest during the war period where the principal increase in the use of direct application rock has occurred.
3. Use under the agricultural conservation programs in a number of states.
4. Increased equipment for bulk handling of direct application rock.

Published experimental data and current successful usage point to the following general conditions under which direct application rock may be used profitably: (1) in long-time soil building programs on soils that are slightly acid, but not on neutral or alkaline soils; (2) in systems of farming where deep-rooted and other legumes occupy the land about half the time; and (3) where supplemental fertilizers containing superphosphate are used on row crops, small grains, and most nonlegume crops.

The Migrations of Phosphorus and Associated Elements from Incorporations of Various Fertilizer Phosphates and Supplements of Liming Materials and Calcium Fluoride

W. H. MacIntire, W. M. Shaw, and Brooks Robinson, University of Tennessee, Agricultural Experiment Station, Knoxville, Tenn.

Summarized are 12-year findings on rainwater leachings of P, Ca, Mg, K, N, S, and F, from soil incorporations of various phosphatic materials.

Experiment I. Migrations were from full depth in three silt loams that received 11 annual 600-pound incorporations of 16 per cent superphosphate in the upper third of soil, with and without limestone and dolomite. The two lower zones of two acidic soils allowed only 0.5-pound enhancements in outgo of phosphorus from combinations of super and liming materials, whereas the alkaline Calhoun soil yielded passage of phosphorus up to 18 pounds; increases in phosphorus outgo induced by dolomite supplements were significantly greater than those caused by limestone, whereas rock phosphate caused no increase in phosphorus outgo. Outgo of calcium was not increased by either dolomite or rock phosphate. Magnesium outgo was repressed by limestone and increased by dolomite, whereas outgo of potassium was diminished by both limestone and dolomite.

Experiment II, 10 years. The two-ton incorporations of rock phosphate and corresponding quantities of di-, tri-, and metaphosphates of calcium were made full depth, with single initial supplements of limestone or dolomite, and annuals of calcium fluoride. All phosphorus migrations were meager. Annual outgo of calcium from rock phosphate alone was only 39 pounds calcium carbonate and —23 pounds when rock phosphate was supplemented by magnesium carbonate. Largest increase in annual migration of calcium from any phosphate alone was that of 119 pounds calcium carbonate from the dicalcium. Separate increases of less than 40 pounds came from rock phosphate, tri-, and meta-, whereas annual increases up to 189 pounds came from calcium fluoride supplements and these increases were multiples of the respectively corresponding increases in fluorine leachings, which were always less than five pounds. Limestone invariably caused decrease in magnesium outgo, but the migrations of magnesium from the five dolomite supplements were uniform at 140 pounds per annum ($CaCO_3$ equivalent). Annual outgo of potassium was repressed one to four pounds by the additions of calcium in association with PO_4, CO_3, or F_2.

Experiment III, 10 years. The nine 320-pound annual incorporations of P_2O_5 as H_3PO_4, mono-, di-, and tricalcium phosphates and as fused tricalcium phosphate were made full depth to the Hartsells acidic fine sandy loam, without supplements. No increase in outgo of phosphorus came from H_3PO_4 or from rock phosphate. The 28-pound total outgo of phosphorus from dicalcium was nine times that from monocalcium and seven times that from the tricalcium. The H_3PO_4 caused a decrease in outgo of calcium in contrast to enhancements up to 1,200 pounds ($CaCO_3$) from the dicalcium and smaller yet substantial enhancements from tri- and monocalcium phosphates. Every solid phosphate caused significant decreases in outgo of magnesium and potassium, with increases for SO_4 and NO_3.

In a parallel series, nine-year migrations of phosphorus from corresponding unsupplemented incorporations of H_3PO_4, mono- and diammonium phosphates in Dewey silt were 42, 58, and 31 pounds, respectively. Releases of both calcium and magnesium were decreased by H_3PO_4, but were increased by the monoammonium and more so by the diammonium. The three materials exerted like effect upon outgo of potassium, and of SO_4. In every comparison (save that for phosphorus) outgo from $(NH_4)_2SO_4$ controls exceeded by far that from either additive phosphate.

The over-all conclusion is that continuation of phosphorus in mobile state readily utilizable by plants is governed by how appropriate the type of phosphorus input is to a specific soil of proper alkaline-earth content, either natural or provided.

Preparation of Radioactive Phosphate Fertilizer for Plant-Utilization Tests by Tracer Methods

W. L. Hill, E. J. Fox, and J. M. Mullins, Soils Divisions, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

The use of radioactive phosphorus as a tracer to determine the utilization of applied phosphate by growing plants affords a means for comparing the efficiencies of different phosphates on fertile as well as infertile soils. A greenhouse experiment of this type, requiring beaker lots of materials, was conducted by the bureau in late 1946. Less than a year later, plans were nearly complete for elaborate field experiments comprising five radioactive phosphate materials and 11 crops in five states. The fertilizer requirement of 700 to 800 pounds of radioactive phosphates necessitated the provision of special equipment in an

isolated room for their preparation. Facilities were devised for the preparation of superphosphate, ammoniated superphosphate, dicalcium phosphate, alpha-tricalcium phosphate, and calcium metaphosphate glass with proper precautions for the health of the operators.

The basic problem consisted of the dilution of a very active phosphate (KH_2PO_4) with inactive phosphate and the complete conversion of the mixture into the desired form. Use was made of conventional methods of processing phosphates with suitable modifications in technique to provide substantially complete recovery of the material in the batch and to protect the operator from exposure to harmful radiation. The choice of a technique was controlled almost entirely by the latter consideration. The most desirable process was, in general, the one that required the fewest transfers of material. For example, in the preparation of superphosphate acidulation and curing were accomplished in the same container, whence the product was excavated and reduced to a suitable fineness in another unit operation.

The Presence and Determination of Molybdenum and Rare Earths in Phosphate Rock

W. O. Robinson, U. S. Department of Agriculture, Beltsville, Md.

Five grams of phosphate rock are fused with 15 grams of sodium carbonate. Molybdenum is determined in the aqueous leachate by the thiocyanate colorimetric method and the rare earths in the residue. Molybdic oxide (MoO_3) ranged from one to 208 parts per million in 20 samples and the rare earths from 110 to 1,550 parts per million. Island and Tennessee rock phosphates are low in molybdenum. Florida and North African rock phosphates generally exceed 20 p.p.m. and some may contain several times that quantity. One western deposit contained 208 p.p.m. Apparently the molybdenum in the phosphate rock is retained in the superphosphate manufactured from it.

The Influence of Phosphate Fertilization on the Carotene and Riboflavin Content of the Soybean Plant

W. J. Peterson, F. W. Sherwood, Gennard Matrone, Harriet Pressly, and Horace P. Andrews, North Carolina State College, Raleigh, and U. S. Plant, Soil, and Nutrition Laboratory, Ithaca, N. Y.

A study was made of the influence of application of the equivalent of 40 pounds of P_2O_5 per acre to a Bladen type soil deficient in phosphorus upon the carotene and riboflavin content of the mature soybean plant. Though the mean weight of individual plants receiving the phosphorus treatment was 2.5 times as great as those without phosphorus treatment, the proportions of leaves, stems, and pods were not influenced significantly by fertilization. The weight-distribution of the parts of the soybean plant was 54.2 per cent stems, 25.8 per cent leaves, and 20.0 per cent pods. The carotene and riboflavin contents of the leaves only were significantly increased by phosphate fertilization: carotene from 186.4 to 222.6 micrograms per gram on an air-dry basis, and riboflavin from 22.03 to 25.69 micrograms per gram. Though the leaves made up only 25.8 per cent of the total weight of the soybean plant, they contained 93.4 per cent of the carotene, and 62.7 per cent of the riboflavin.

The Fate of Phosphate Soil Supplements

Jackson B. Hester, Campbell Soup Co., Riverton, N. J.

There are seven general factors in the soil that influence the availability to growing plants of added phosphates namely, the amount and composition of clay in the soil, the amount and composition of the organic matter in the soil, soil pH value and replaceable bases, drainage and microbiological activity, time and temperature, the amount and composition of the phosphates added, and the crop rotation and test crops used.

The greater the amount of clay and the larger the amount of iron and aluminum in proportion to silicates, the greater the fixation. The larger the amount of organic matter present, the greater the availability of phosphates. By and large, a pH value of approximately 6.5 increases the availability of phosphates in the soil. Poor drainage lessens the availability and the longer the time of application, the lower the availability. Calcium phosphates are more available under general conditions than other forms of phosphorus. Vegetable crops require more readily available phosphorus than agronomic crops.

Bemis Acquires Gallie-King Property

The land, buildings and equipment formerly owned by the Gallie-King Bag Co., Houston, Tex., has been purchased by Bemis Bro. Bag Co., which took possession of the property on July 28th. All orders on the books of the Gallie-King Company are being delivered by that company.

The Bemis Company will use the property as an addition to its present facilities in Houston, where it manufactures both textile and paper bags, probably devoting much of the additional space thus acquired to the manufacture of paper bags.

F. V. Deaderick, manager of the Bemis factory at Houston, handled the transaction for his company and will add supervision of the new property to his responsibilities.

SOME IMPLICATIONS OF SOIL FERTILITY

(Continued from page 10)

As larger crops and more crops have been harvested and hauled off the farm, the rate of removal of the elements essential to plant growth has been proportionately speeded up.

Despite increases in agricultural production and the apparent growing number of nutrient deficiencies in both soils and plants, our life expectancy is lengthening. One explanation for this may lie in the ever-increasing diversity of our diet resulting from improved transportation of foodstuffs from distant points. The whole earth is our bread basket. A deficiency of produce from one soil may be ironed out by the abundance in the produce from another. Will control of the mineral content of our diet be by way of the soil or the salt shaker, is still a challenging problem.

(To be concluded in the next issue)

SOME ECONOMIC CONSIDERATIONS

(Continued from page 11)

per cent of the total debt of the country outstanding, public and private. Today, the total of public debt constitutes some 60 per cent of all debt. Today, Federal debt is the predominating factor in determining interest rates on private debt, and the return on practically all types of investments.

It is evident, therefore, that proper management of the public debt is important, not merely because of its impact upon the financial affairs of the Government itself, but because of the effect of debt management upon our entire economy. It is evident that the management of our large public debt is such a dominant factor in the economic life of the nation that it is imperative that firm control of debt management be exercised by the Federal Government. No matter how strongly we may feel that the controls exercised by the Federal Government should be at a minimum, we must realize that a firm control of debt management must continue as long as the public debt maintains its present significance.

There has been little disagreement as to the correct overall policy of debt management since February 1946—when the gross Federal debt, including guaranteed obligations, reached its peak of 280 billion dollars. Throughout this period, there have been strong inflationary pressures in our economy. It has been obvious, therefore, that proper debt management required reduction of the Federal debt, and especially of that held by banks, as rapidly as possible.

This was accomplished, first, by drawing down the cash balance of the Treasury to a peacetime working level; and, then, by applying the budget surplus to debt reduction. In the fiscal year which ended last June, there was a budget surplus of approximately ¾

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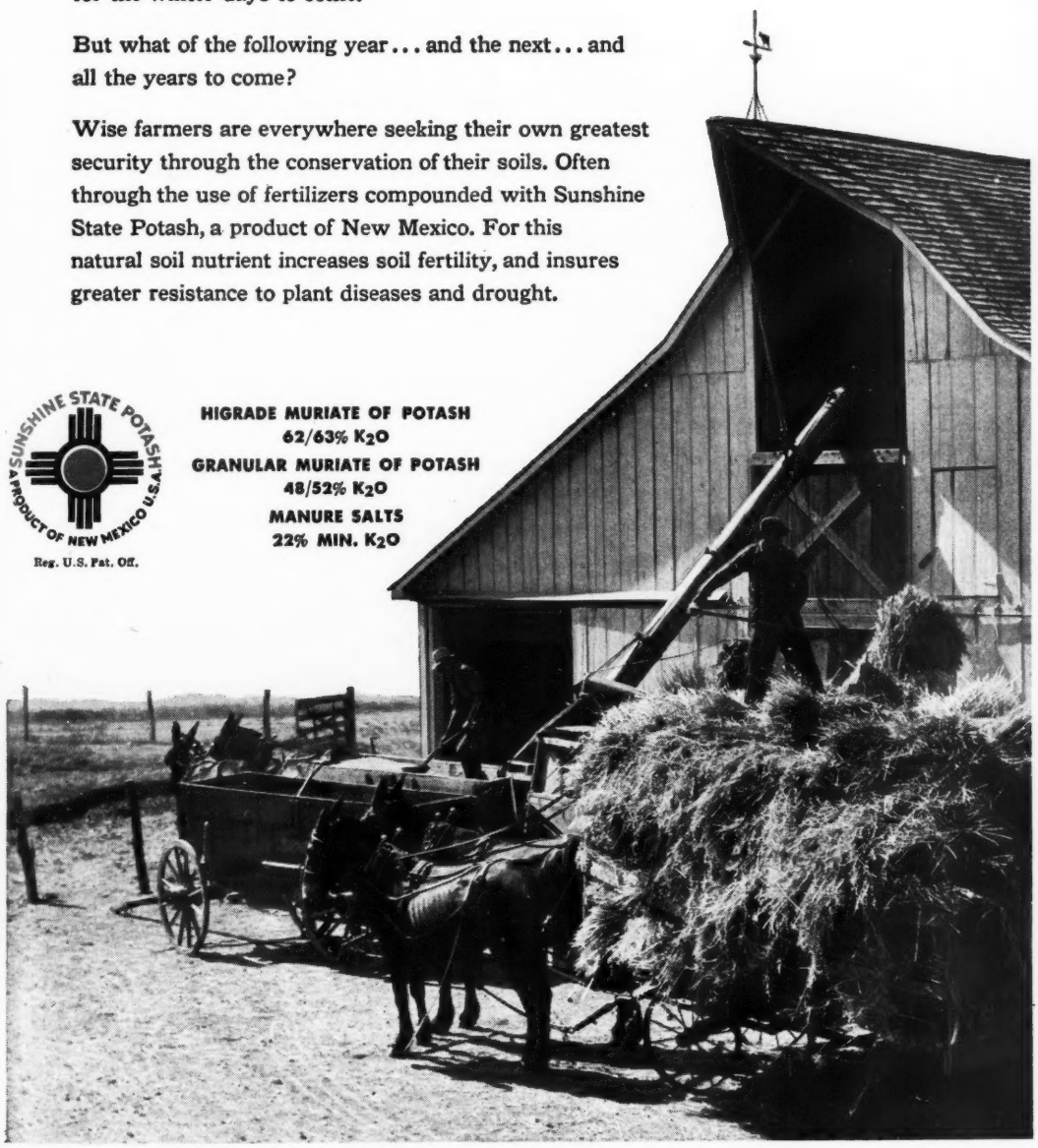

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billion dollars. In the current fiscal year, it appears that the budget surplus will be in excess of seven billion dollars. This latter figure, of course, is before deducting the three billion dollars of expenditures under the Economic Co-operation Program which Congress has directed shall be earmarked and charged against the 1948 budget and credited to the 1949 budget. This transaction is merely a bookkeeping one that does not affect the time of receipt by the Government of a dollar of income or the time of payment of a dollar of expenditures. From the standpoint of debt management, this bookkeeping transaction has no effect at all.

Federal Debt Down 28 Billion Dollars from Peak

The Federal debt has been reduced by nearly 28 billion dollars since the end of February 1946. In the same period, however, the debt held by the commercial banking system has been reduced by about 30 billion dollars. Reduction in bank-held debt has an anti-inflation effect through a reduction in bank assets and deposits. It has been possible to reduce the debt held by the commercial banking system by a larger amount than the total reduction in the gross debt because of an increase of about two billion dollars in debt held by non-bank investors. The most important factors accounting for this increase in non-bank holdings were the excess of savings bond sales over redemptions and the net increase in the United States security holdings of Government trust funds, offset in part by a reduction in corporate holdings of Government securities.

This debt-management policy has been supplemented by a gradual tightening in the money market. In the past year, interest rates on short-term Government securities have been increased from 3/8 per cent to about one per cent in the case of three-month Treasury bills, and from 7/8 per cent to 1 1/8 per cent in the case of Treasury certificates; while the premiums at which long-term Government securities were selling have been sharply reduced, with the effect of stiffening the terms on which corporations and others can borrow money for expansion purposes. In addition, the bank supervisory authorities have urged caution in the lending policies of the banks under their direction, and the American Bankers Association has conducted a voluntary campaign among its members to the same end.

All of these steps have been effective in encouraging banks to screen their loan applications more carefully. As a consequence, the inflationary expansion of bank loans during the past year has, in my opinion, been held to a minimum, and has been offset, in large part, by the restrictive effects of public debt management.

The conscious adoption by the Government of a restrictive policy of debt management—and the possibility of the reversal of this policy in the event of a business recession—represents one phase, and I believe a healthy one, of the larger role of Government in the present economy than in the period immediately following World War I.

As far as our domestic affairs are concerned, therefore, there is every reason for facing the future far more confidently than was possible in 1920. This applies both to agriculture and to industry. It applies especially to the fertilizer business, which lies on the border line between the two. We are not going back to the days of give-away farm prices; neither are farmers going back to the days of mining their soil. We look to the fertilizer industry as one of the key factors in our national policy of maintaining unimpaired the agricultural productivity of America. This productivity is the base upon which rests a strong and satisfying social and economic order at home and is the foundation upon which world stability and peace may be built.

BUYERS' GUIDE • A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"

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AMMONIUM NITRATE
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BONE PRODUCTS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
Huber & Company, New York City
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
Huber & Company, New York City
Jackle, Frank R., New York City.
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Schrock Fertilizer Service, Congerville, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—For Hoists, Cranes, etc.
Hayward Company, The, New York City

BUCKETS—Elevator
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARS AND CARTS
Atlanta Utility Works, The, East Point, Ga.
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind

CHEMICALS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Commercial Solvents Corp., New York City
Davison Chemical Corporation, Baltimore, Md.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago Ill.
Lion Oil Company, El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Spencer Chemical Co., Kansas City, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS
Arkansas Rice Growers Corp. Assn., Stuttgart, Ark
Jackle, Frank R., New York City.
Keim, Samuel D., Philadelphia, Pa.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CYANAMID
American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City

DRYERS
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Titlestad Corporation, Nicolay, New York City

FERTILIZER (Mixed) MANUFACTURERS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Schrock Fertilizer Service, Congerville, Ill.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City.
McIver & Son Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

FOUNDERS AND MACHINISTS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agricultural Chemical Co., New York City

LEAD BURNERS
Southern Lead Burning Co., Atlanta, Ga.

LIMESTONE
American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

LOADERS—Car and Wagon
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Elevating and Conveying
Atlanta Utility Works, The, East Point, Ga.
Hough Co., The Frank G., Libertyville, Ill.
Hayward Company, The, New York City
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Hayward Company, The, New York City
Hough Co., The Frank G., Libertyville, Ill.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MACHINERY—Power Transmission
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

MANGANESE SULPHATE
McIver & Son, Alex. M., Charleston, S. C.

MINOR ELEMENTS
Agricultural Minerals Co., Montgomery, Ala.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

NITRATE OF SODA
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.

NITROGEN SOLUTIONS
Lion Oil Company, El Dorado, Ark.
Spencer Chemical Co., Kansas City, Mo.

NITROGENOUS ORGANIC MATERIAL
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J. New York City
Davidson Commission Co., The, Chicago, Ill.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill
Jackle, Frank R., New York City.
McIver & Son. Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.

PHOSPHATE ROCK
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.

PLANT CONSTRUCTION—Fertilizer and Acid
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.
Southern Lead Burning Co., Atlanta, Ga.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.
Titlestad Corporation, Nicolay, New York City

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City.

POTASH SALTS—Manufacturers
American Potash and Chem. Corp., New York City
Potash Co. of America, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
United States Potash Co., New York City

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYRITES—Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.

REPAIR PARTS AND CASTINGS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

BUYERS' GUIDE

SCALES—Including Automatic Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SCREENS
Atlanta Utility Works, The, East Point, Ga.
Link-Belt Co., Chicago, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.
Sturtevant Mill Company, Boston, Mass.

SEPARATORS—Air
Kent Mill Co., Brooklyn, N. Y.
Sackett & Sons Co., The A. J., Baltimore, Md.
Sturtevant Mill Co., Boston, Mass.

SPRAYS—Acid Chambers
Monarch Mfg. Works, Inc., Philadelphia, Pa.

SULPHATE OF AMMONIA
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULPHUR
Ashcraft-Wilkinson Co., Atlanta, Ga.

SULPHURIC ACID
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicaro, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davison Chemical Corporation, Baltimore, Md.
Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

TAGS
Keener Mfg. Co., Lancaster, Pa.

TANKAGE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

Alphabetical List of Advertisers

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POTASH COMPANY OF AMERICA

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Sul-Po-Mag is formed by nature in the mineral langbeinite which is mined and refined exclusively by International at Carlsbad, New Mexico. Both the sulfate of potash and magnesium in Sul-Po-Mag are in water-soluble form and are quickly available to crops.

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